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Notes on Geographical Forms of the Chalcosiine Moth *Eterusia aedea* (Lepidoptera, Zygaenidae)¹⁾

By

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大和田 守*: オキナワルリチラシの地理的変異について

Eterusia aedea (CLERCK) is one of the large beautiful chalcosiine moths of the family Zygaenidae, widely distributed in Sri Lanka, India, Burma, Thailand (new record), China, Taiwan and Japan. In India this species is well known as a serious pest of tea-plantation and as a polymorphic moth in the Himalayan hills.

Geographically this species is also variable, and divided into several subspecies. After JORDAN (1908) it was separated into the following five subspecies: *E. aedea cingala* MOORE, 1877, from Sri Lanka, *E. aedea virescens* BUTLER, 1881, from South India, *E. aedea edocla* DOUBLEDAY, 1847, from North India and Burma, *E. aedea aedea* (CLERCK, 1759) from China and *E. aedea formosana* JORDAN, 1908, from Taiwan.

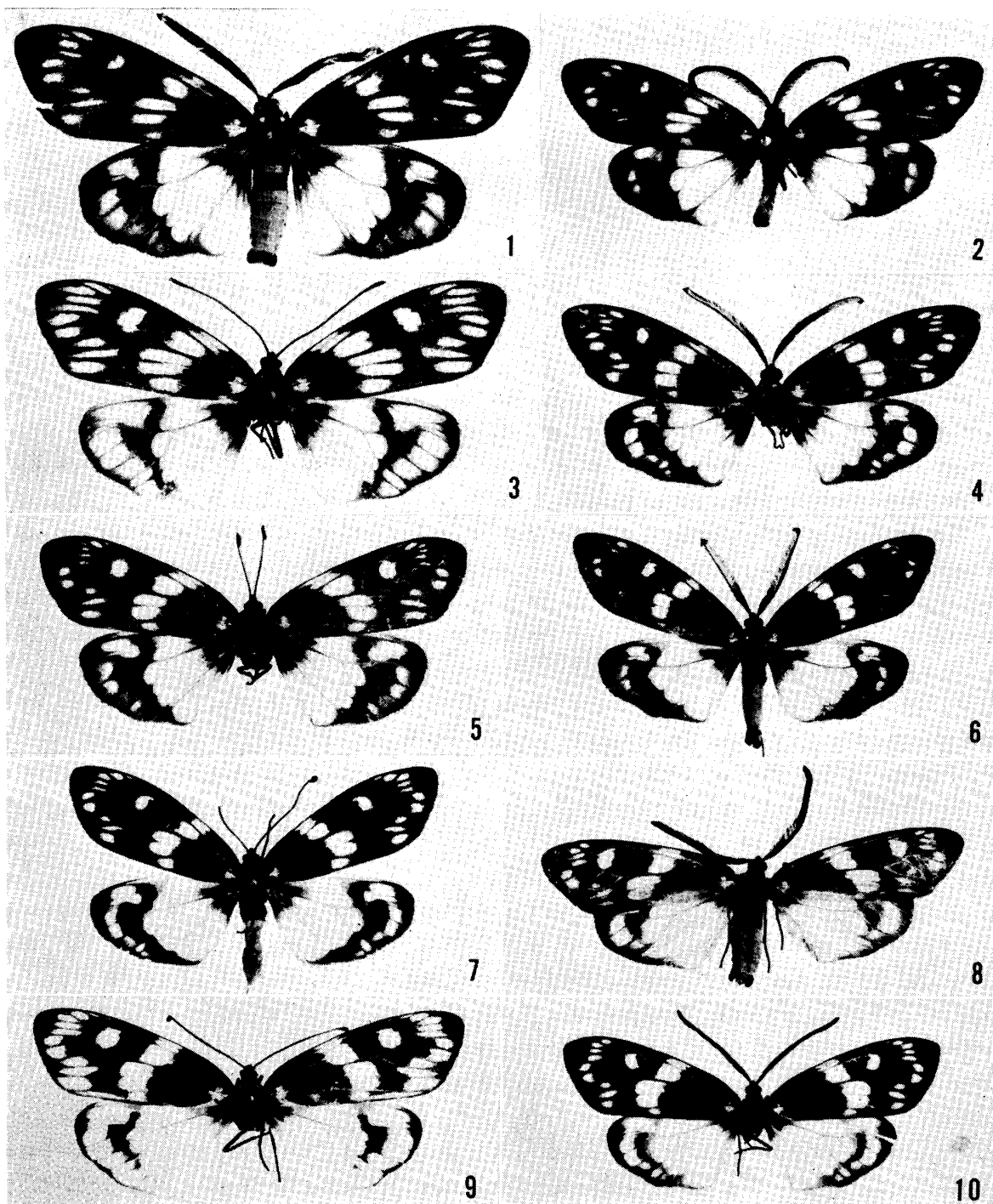
MATSUMURA (1927) described three forms of *E. aedea* from Japan, i.e., *sugitanii* from Nara, central Honshu, *okinawana* and *sakaguchii* from Okinawa, the Ryukyus. Although the first-named was described as a subspecies, the latter two were unavailable, named as aberrant forms (infrasubspecific). In his later work, MATSUMURA (1931) treated all of them as "forma", and this treatment can be considered the elevation of infrasubspecific names (Articles 10c and 45f-g of the Code, 1985), (INOUE, 1982, 2: 217).

INOUE (1955) separated Japanese populations into two subspecies, i.e., *E. aedea sugitanii*, from mainland Japan and Tsushima, and *E. aedea okinawana*, from the Ryukyus. In 1956, ESAKI and INOUE described a subspecies, *okinoshimensis*, from the Island of Okinoshima, lying off Fukuoka, northern Kyushu, and pointed out that there could be some more subspecies to be separated from those forms by further studies. And NAGAYOSHI (1967) reported that there are some differences in the wing maculation among specimens from the Ryukyus and Taiwan.

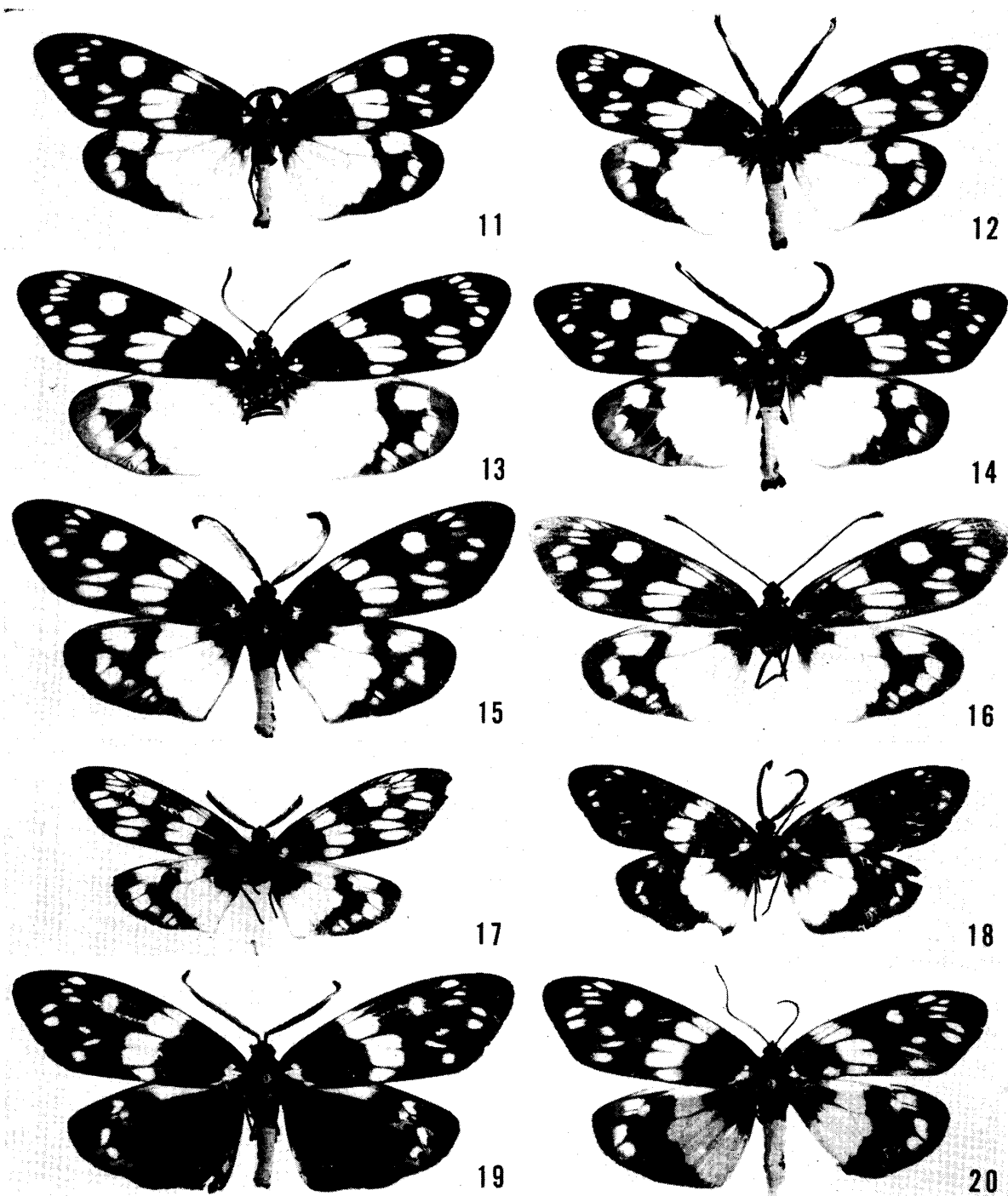
Besides those works, INOUE (1982) drew a conclusion based on many specimens that they can be separated into four geographic races, i.e., *sugitanii* from Honshu, Shikoku, Kyushu,

1) This study is supported in part by the Grants-in-aid Nos. 404101, 56041060, 58041074, 62041074 and 01041099 for Field Research of the Monbusho International Scientific Research Program, and by the Grant-in-aid No. 62540572 for Scientific Research from the Ministry of Education, Science and Culture, Japan.

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Figs. 1-10. *Eterusia aedea* subspecies. —1. Subsp. *sugitanii*, ♂, Izu. —2. Subsp. *sugitanii*, ♂, holotype, Nara. —3. Subsp. *sugitanii*, ♀, Oki. —4. Subsp. *micromaculata*, ♂, paratype, Yakushima. —5. Subsp. *micromaculata*, ♀, paratype, Yakushima. —6. Subsp. *tomokunii* nov., ♂, holotype, Amami-ôshima. —7. Subsp. *tomokunii* nov., ♀, paratype, Amami-ôshima. —8. Subsp. *sakaguchii*, ♂, holotype, Okinawa. —9. Subsp. *sakaguchii*, ♀, Okinawa. —10. Subsp. *sakaguchii*, ♀, Tokashiki.



Figs. 11–20. *Eterusia aedea* subspecies. 11. Subsp. *okinawana*, ♂, holotype, Okinawa.—12. Subsp. *okinawana*, ♂, Ishigakijima.—13. Subsp. *okinawana*, ♀, Ishigakijima.—14. Subsp. *okinawana*, ♂, Ishigakijima.—15. Subsp. *formosana*, ♂, Taiwan.—16. Subsp. *formosana*, ♀, Taiwan.—17. Subsp. *aedea*, ♂, Chekiang.—18. Subsp. *virescens*, ♂, India, Nilgiris.—19. Subsp. *edocla*, ♂, Nepal.—20. Subsp. *edocla*, ♀, Nepal.

Okinoshima Is. (= *okinoshimensis*), Oki and Tsushima, *micromaculata* INOUE, 1982, from Yakushima Is., *okinawana* from the Tokara Group, Amami-ôshima Is., the Kerama Group and Okinawa Is. of the Ryukyus, and *ishigakiana* INOUE 1982, from the Yaeyama Group of the Ryukyus.

Recently I had an opportunity to examine many specimens from Amami-ôshima Island, collected by Mr. M. TOMOKUNI, and found that they belong neither to *micromaculata* nor to *okinawana*. And for clarifying the relationship among populations from the Ryukyus, I examined intensively their wing maculation and genitalia. Through the courtesy of Professors H. INOUE and T. KUMATA, I was able to examine the type material of *micromaculata*, *sugitanii*, *okinawana* and *sakaguchii*. In addition to these, I carefully investigated specimens from India, Burma, Thailand, China, Taiwan and main islands of Japan.

In this paper, I will give brief notes on the characters of geographical races of *Eterusia aedea* examined, description of a new subspecies from the Island of Amami-ôshima, and also some taxonomic and nomenclatural changes.

Eterusia aedea sugitanii MATSUMURA

(Figs. 1–3)

Eterusia aedea virescens: EZAKI, 1917, Coll. Essays for Y. Nawa, 83, fig. 4, nec BUTLER, 1881.

Eterusia aedea sugitanii MATSUMURA, 1927, J. Coll. Agr. Hokkaido imp. Univ., 19: 83, pl. 3, fig. 9; BRYK, 1936, in STRAND (ed.), Lepid. Cat., 71: 208; INOUE, 1955, Check List Lepid. Japan, 202; ESAKI, 1957, in ESAKI *et al.* (eds.), Icones Heterocer. Japon. Col. Nat., [1]: 156, pl. 28, fig. 811; INOUE, 1959, in INOUE *et al.* (eds.), Icon. Ins. Japon. Col. nat. ed., 1: 228, pl. 163, fig. 4; NAGAYOSHI, 1967, Tyô to Ga, 18: 35; INOUE, 1982, in INOUE *et al.* (eds.), Moths Japan, 1: 292, 2: 217, pl. 33, figs. 1–5.

Eterusia aedea f. *sugitanii*: MATSUMURA, 1931, 6000 illust. Insects Japan-Empire, 987, fig.

Eterusia aedea okinoshimensis ESAKI *et* INOUE, 1956, Tinea, 3: 133, figs. 2–6; ESAKI, 1957, in ESAKI *et al.* (eds.), Icones Heteroc. Japon. Col. Nat., [1]: 156, pl. 28, figs. 812, 813; INOUE, 1959, in INOUE *et al.* (eds.), Icon. Ins. Japon. Col. nat. ed., 1: 228; INOUE, 1982, in INOUE *et al.* (eds.), Moths Japan, 2: 217, synonymy.

Length of forewing. ♂, 28–37 mm; ♀, 32–34 mm.

Material examined. Holotype of *E. aedea sugitanii* MATSUMURA, 1927, ♂ (Fig. 2), labeled “Nara, IX. '26 / sugitanii Mats. [in hand writing] / Holotype, Matsumura Coll. [in cold printing on red label].” Honshu:— Shizuoka Pref., Izu, Yugashima, Sanbonmatsu, 1 ♂, 1. IX. 1961, A. FUKUI leg., Yugashima, 8 ♂, 30. VIII. 1987, Y. KISHIDA *et al.* leg., same locality, 16 ♂, 5. IX. 1987, H. NAKAJIMA leg.; Nara Pref., Nara, 1 ♂, 15. VIII. 1931, H. OHBAYASHI leg., same locality, 1 ♂, 1. IX. 1936, Y. YANO leg.; Wakayama Pref., Ryûjin, Yumoto, 2 ♂, 27. VIII. 1970, S. NAKATANI leg., Mts. Ôtô-san, Shimokawa-Ôsugidani, 1 ♂, 21. VIII. 1973, S. NAKATANI leg., same locality, 1 ♂, 23. IX. 1972, S. NAKATANI leg., Mts. Ôtô-san, 1 ♂, 25. IX. 1971, M. YAGI leg. Shikoku:— Kôchi Pref., Kami, Makiyama, 2 ♂, 30. VIII. 1954, T. INOUE leg., Mt. Yokokura, 1 ♂, 22. VIII. 1959, Y. KAWAKAMI leg. Oki:— Tsuma, Dankyô-no-taki, 1 ♂, 11. IX. 1985, H. KADOWAKI leg., Fuse, Daimanji, 1 ♀, 10. IX. 1970, H. KADOWAKI leg., Saigô, Chôsi, 6 ♂, 10. IX. 1985, H. KADOWAKI leg., Chiburi Is., 14. IX. 1988, H. YUI leg. Tsushima:— Asamo, 1 ♂, 3. VIII. 1973, T. WATANABE leg., Katsunuma,

1 ♂, 27. VIII. 1953, M. TSUDA, Izuhara, 1 ♂, 30. VIII. 1955, M. TSUDA leg., Sago, 1 ♂, 2. IX. 1973, T. WATANABE leg., Taterayama, 4 ♂, 6. IX. 1973, T. WATANABE leg., Kuhara, 1 ♂, 14. IX. 1955, M. TSUDA leg. Kyushu:— Miyazaki Pref., Shiiba, 4 ♂, 6–13. IX. 1972, S. KOGA leg., Kagoshima Pref., Mts. Kirishima, Kurikawa, 2 ♂, 18. IX. 1960, Y. TAKEMURA leg., Nishi-Shibushi, Mobara, 1 ♂, 20. VI. 1951, H. FUKUDA leg.

Distribution. Japan (Central and western Honshu, Shikoku, Oki, Tsushima, Kyushu).

Diagnosis. Forewing rather broad, hind angle somewhat prominent; ground colour on the upperside moss-green, tinged with gold or red in some specimens; transverse white lines broad, especially in female; white discocellular mark rather small in male, large in female, veins in the mark stained with ground colour, dividing the white mark. Hindwing rather broad, inner and terminal bands broad, median band pale yellow or white. In male genitalia (Figs. 21–22), 8th sternite with a pair of sclerotized process which is smoothly pointed; uncus somewhat trapezoidal, apical margin slightly convex or straight, membraneous in middle portion; valva rather slender. In female genitalia (Fig. 34–35), ovipositer slender; 7th sternite almost regularly triangulate; corpus bursae slightly longer than 7th sternite, with a small appendix bursae.

Notes. Moths inhabit primary forests of evergreen broadleaved trees and seem not to invade tea-plantations, and larvae were collected from leaves of *Eurya japonica*, Theaceae, at Yugashima, the Izu Peninsula (YAMAMOTO, oral communication). On the other hand, larvae, emerged from ova laid by a female collected at Oki, favoured *Camellia japonica*, Theaceae, and almost refused *Eurya japonica* (NISHIDA, 1980). Usually there is one generation a year, adults appear from late summer to early autumn (August–September), and males are attracted to light at night, but no female was collected by light trap and their day-flying activity seemed to be low at Yugashima, Izu (FUKUI, 1963; NAKAJIMA, 1988; KISHIDA *et al.*, 1988). Since one male was collected on 20th June, in Kagoshima Pref., southern Kyushu, there may be two generations a year in the southern periphery of distributional range of this subspecies.

The distributional areas are quite sporadical, and it can be pointed out that some local populations are distinguished from others, i.e., specimens from the Izu Peninsula are largest (Fig. 1) and those from Nara (Fig. 2) and Wakayama are the smallest and have minute outer white band on forewing; transverse lines of forewing are broadest in those from Tsushima and Oki, being similar to those from China, the nominotypical subspecies; those from Okinoshima Island, off northern Kyushu, were considered once as good subspecies by ESAKI and INOUE (1956); those from Shikoku and Kyushu are somewhat intermediate between those from Izu and Tsushima. Many more specimens are needed for making discussion on the relationship of local populations of this subspecies.

Eterusia aedea micromaculata INOUE

(Figs. 5–6)

Eterusia aedea micromaculata INOUE, 1982, in INOUE *et al.* (eds.), Moths Japan, 1: 292, 2: 217, figs. 6–7.

Eterusia aedea okinawana: INOUE, 1955, Check List Lepid. Japan: 203, part; INOUE, 1959, in INOUE *et al.* (eds.), Icon. Ins. Japon. Col. nat. ed., 1: 228, part, nec MATSUMURA, 1931.

Length of forewing. ♂, 26–31 mm; ♀, 25–31 mm.

Material examined. Holotype of *E. aedea micromaculata* INOUE, 1982, ♂, labeled “Kurio (E), Yakushima, 15. V. 1972, T. WATANABE / Holotype, *Eterusia aedea micromaculata* INOUE, (1980 [sic]) [in hand writing on red label]”, in the collection of H. INOUE. Paratypes of *micromaculata*:— Same locality and collector as the holotype, 3 ♂, 15. V. 1972, 10 ♂, 10–12. VI. 1972, 4 ♂, 9. X. 1972; Yakushima, 1 ♀, 10. VII. 1952, Y. KUROSAWA leg., Yakushima, Onoaida, 1 ♀, 30. X. 1971, T. WATANABE leg., Yakushima, Anbou, 1 ♀, 15. VII. 1968, Y. KISHIDA leg., Yakushima, Miyanoura, 1 ♂, 28. IX. 1972, 1 ♀, 25. IX. 1971, T. WATANABE leg., Yakushima, Kusakawa, 1 ♂, 25. X. 1972, T. WATANABE leg.

Tokara Islands:— Nakanoshima Is., 1 ♂, 30. V. 1962, M. SATO leg.

Distribution. Yakushima Island and Nakanoshima Island of the Tokara Islands.

Diagnosis. Rather small; in forewing, ground colour moss-green, white dots forming transverse lines shorter than those of *sugitanii*, veins in white discocellular mark not so prominent as in *sugitanii*; in hindwing, basal and terminal blackish bands slightly slenderer than in *sugitanii*. In male genitalia (Fig. 23), 8th sternite as in *sugitanii*; uncus trapezoidal, rather short, apical margin rounded, concave at middle, basal margin broadly sclerotized; valva short and broad. Female genitalia (Fig. 36) almost same as in *sugitanii*, apical portion of 7th sternite slightly produced.

Notes. There are two generations a year. The size and maculation are similar to those in the specimens from Nara and Wakayama, and the male genitalia are somewhat similar to those in the Oki specimens (Fig. 22). The specimen from Tokara is very similar to those from Yakushima, but the transverse lines of forewing are broader.

Eterusia aedea tomokunii subsp. nov.

(Figs. 6–7)

Length of forewing. ♂, 25–28 mm; ♀, 24–29 mm.

Type series. Holotype, ♂ (Fig. 6), labeled “(RYUKYUS), Mt. Yuwan-dake, Amami-oshima, 5. XI. 1984, M. Tokokuni.” Paratypes:— Same data as the holotype, 7 ♂ 4 ♀; Amami-ôshima, Uragami, 1 ♀, 28. V. 1961, Y. SAKAE, in H. INOUE Coll.

The holotype and paratypes are preserved in the National Science Museum (Nat. Hist.), Tokyo, unless stated otherwise.

Distribution. Amami-ôshima Island.

Diagnosis. Very small. Forewing rather narrow, anal angle not prominent; ground colour reddish brown in general, or green exceptionally (only one pair); in male, median white band narrow, the inner margin from median cell to cell 2 forming a right angle, discocellular mark rather small, with a minute extension inwardly, reversed comma-shaped, outer white band vestigial, absent in dorsal half in most specimens; in female, median band broader than in male, edged with blue black shade on both sides, discocellular mark as in male, outer band narrow but prominent. In hindwing, inner and outer black bands rather narrow, white dots in outer band not developed in male, developed and continuous in female. In male genitalia (Fig. 24), uncus trapezoidal, well sclerotized, membranous portion very

small, apical margin straight. In female genitalia (Fig. 37), 7th sternite very short, apical ostium part moderately produced.

Notes. Very similar to *E. aedea micromaculata*, but can be distinguished from it by the characters described above.

Moths were collected by Mr. M. TOKOKUNI in well developed warm temperate forests on Mt. Yuwan-dake, the highest mountain in the Island of Amami-ôshima; it was cloudy when the collection was made, and the females seemed not so active, resting on surfaces of tree leaves 3–4 m above, and the males were flying around them slowly in the afternoon.

***Eterusia aedea sakaguchii* MATSUMURA, stat. rev.**

(Figs. 8–10)

‡*Eterusia aedea* ab. *sakaguchii* MATSUMURA, 1927, J. Coll. Agr. Hokkido Univ., 19: 83, pl. 3, fig. 9, named as abnormal form (infrasubspecific), unavailable.

Eterusia aedea f. *sakaguchii* MATSUMURA, 1931, 6000 illust. Ins. Japan-Empire, 988, fig., treated as a geographical form, available.

‡*Eterusia aedea okinawana* f. *sakaguchii*: BRYK, 1936, in STRAND (ed.), Lepid. Cat., 71: 208, infrasubspecific.

Eterusia aedea okinawana: INOUE, 1982, Moths Japan, 1: 292, 2: 217, part, pl. 33, figs. 8–9, nec MATSUMURA, 1931.

Length of forewing. ♂, 27–30 mm; ♀, 27–31 mm.

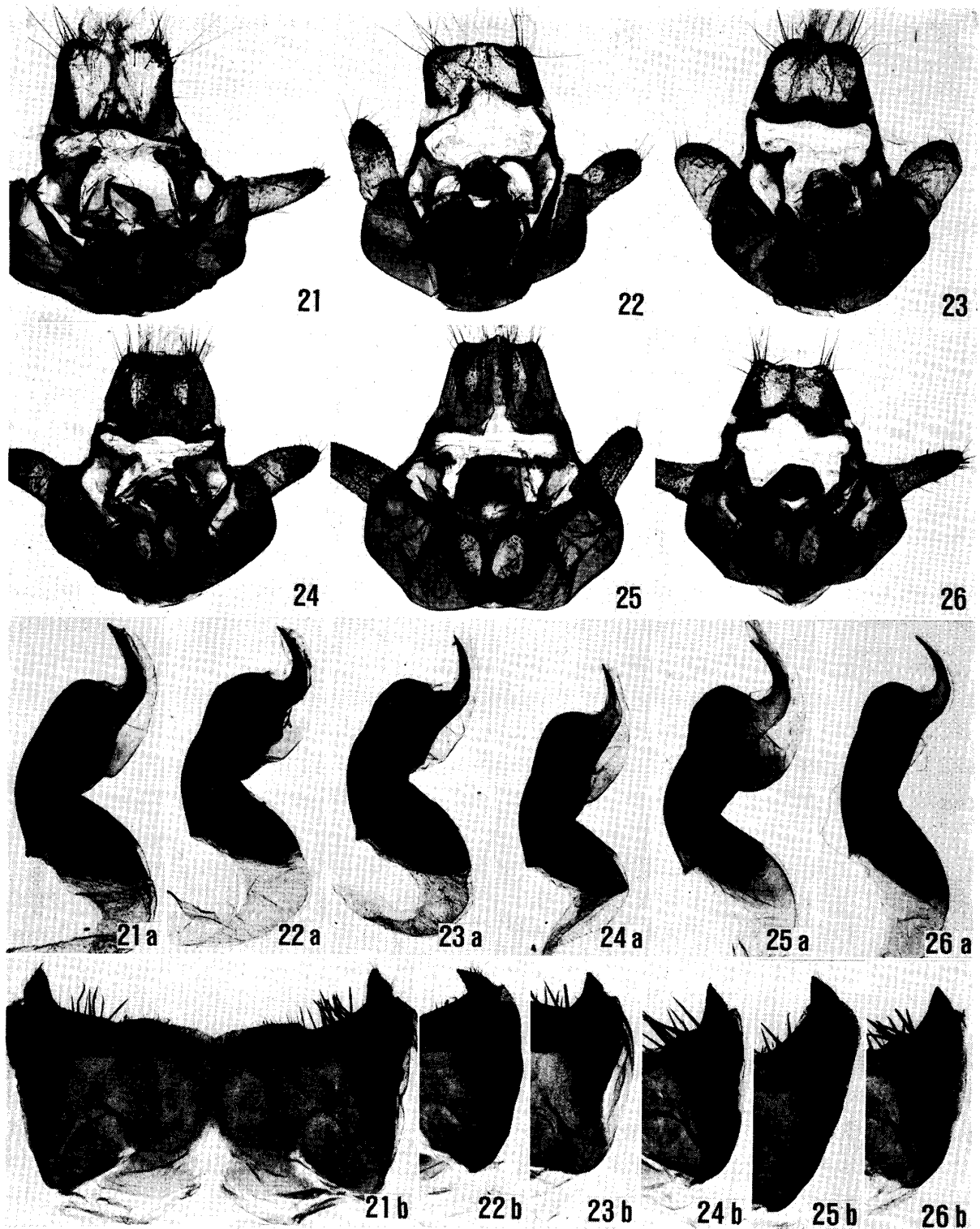
Material examined. Holotype of *E. aedea sakaguchii* MATSUMURA, 1931, ♂ (Figs. 8, 25), labeled “OKINAWA, SAKAGUCHI / ♂ Genitalia on slide, No. Zgn-13, Owada, 1989 [in cold printing partly with hand writing] / okinawana sakaguchii [in hand writing] / Type Matsumura [in cold printing on red label]”, preserved in the Entomological Institute, Hokkaido University.

Okinawa Is.:— Oku, 1 ♂, 23. IV. 1978, S. TSUKASAKI leg., Benoki, 3 ♂, 17. IV. 1977, S. TSUKASAKI leg., Yona, 2 ♂, 9. IV. 1981, K. DEGUCHI leg., 1 ♂ 1 ♀, 17. V. 1962, R. KUROSHIMA leg., 2 ♀, 25–26. XI. 1963, H. INOUE leg., Nago, 1 ♀, 27. IV. 1985, S. ITO leg. Kerama Islands:— Tokashiki Is., 1 ♂, 2. XI, 1975, S. TSUKASAKI leg.

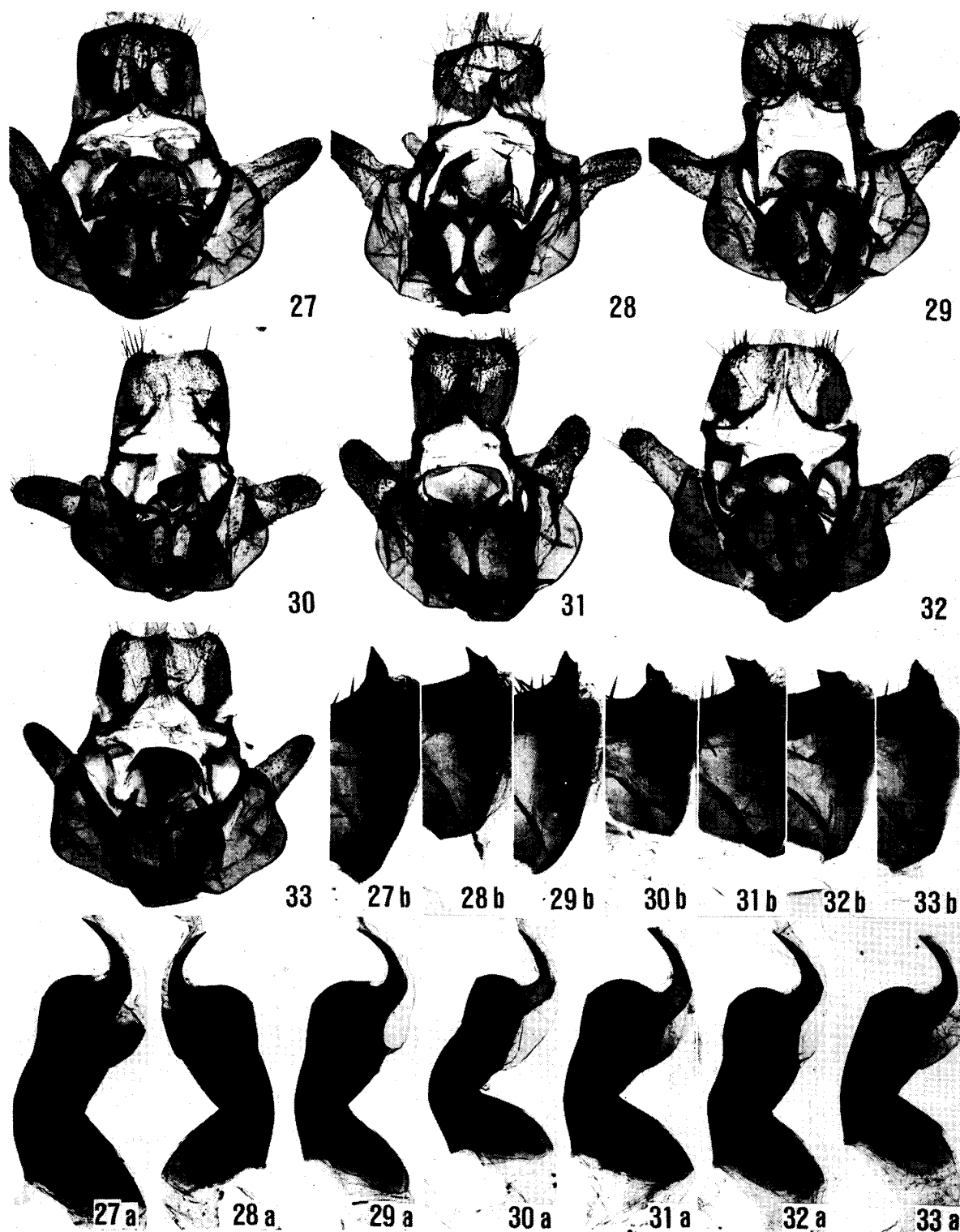
Distribution. Northern Okinawa Island and Tokashiki Island of the Kerama Islands.

Diagnosis. Very small. Similar to *E. aedea tomokunii* from Amami-ôshima, but distinguished from it by the following characters:— Forewing broader, anal angle more prominent, transverse white bands broader; in male median band edged with blue black shade on both sides, with four black streaks in apical portion. Basal and terminal black bands of hindwing very narrow, white dots in the terminal band very wide, especially in female. In male genitalia (Figs. 25–26), apical margin of uncus slightly produced at middle, valva a little longer than in *tomokunii*. In female genitalia (Fig. 38), apical ostium portion of 7th sternite more produced.

Notes. This remarkable subspecies is restricted in warm temperate forests in northern Okinawa, so-called ‘Yanbaru’. In the southern part of Okinawa Island, another subspecies were collected. The taxonomic and nomenclatural treatment will be discussed under the next subspecies.



Figs. 21–26. Male genitalia of *Eterusia aedeia* subspecies; a: aedeagus, b: 8th sternite. 21. Subsp. *sugitanii*, Izu. — 22. Subsp. *sugitanii*, Oki. — 23. Subsp. *micromaculata*, paratype, Yakushima. — 24. Subsp. *tomokunii* nov., paratype, Amami-oshima. — 25. Subsp. *sakaguchii*, holotype, Okinawa. — 26. Subsp. *sakaguchii*, Tokashiki.



Figs. 27–33. Male genitalia of *Eterusia aedeia* subspecies; a: aedeagus, b: 8th sternite. — 27. Subsp. *okinawana*, holotype, Okinawa. — 28. Subsp. *okinawana*, Ishigakijima. — 29. Subsp. *formosana*, Taiwan. — 30. Subsp. *aedeia*, Chekiang. — 31. Subsp. *edocla*, Nepal. — 32. Subsp. *edocla*, Thailand. — 33. Subsp. *virescens*, India, Nilgiris.

Tokashiki Island, in the Kerama Group of the Ryukyus, is a small island lying off Okinawa, about 40 km to the west, from which one male specimen (Fig. 10) has been known. Its wing maculation is almost identical with that in *sakaguchii*, but the uncus is very short and the membraneous portion is rather wide (Fig. 26).

***Eterusia aedea okinawana* MATSUMURA**

(Figs. 11–14)

‡*Eterusia aedea* ab. *okinawana* MATSUMURA, 1927, J. Coll. Agr. Hokkaido Univ., 19: 83, pl. 3, fig. 11, named as abnormal form (infrasubspecific), unavailable.

Eterusia aedea f. *okinawana* MATSUMURA, 1931, 6000 illust. Ins. Japan-Empire, 987, fig., treated as a geographical form, available.

Eterusia aedea okinawana: BRYK, 1936, in STRAND (ed.), Lepid. Cat., 71: 208; INOUE, 1955, Check List Lepid. Japan, 203, part; NAGAYOSHI, 1967, Tyô to Ga, 18: 32, 35–37, part, figs. 5, B; INOUE, 1982, in INOUE *et al.* (eds.), Moths Japan, 2: 217, part.

Eterusia aedea ishigakiana INOUE, 1982, in INOUE *et al.* (eds.), Moths Japan, 1: 292, 2: 217, pl. 33, figs. 10–11, **syn. nov.**

Length of forewing. ♂, 29–37 mm; ♀, 30–37 mm.

Material examined. Holotype of *E. aedea okinawana* MATSUMURA, 1931, ♂ (Figs. 11, 27), labled “Riukiu / ♂ Genitalia on slide, No. Zgn-14, Owada, 1989 [in cold printing partly with hand writing] / okinawana n. ab. [in hand writing] / Type Matsumura [in cold printing on red label]”, in the Entomological Institute, Hokkaido University.

Holotype of *E. aedea ishigakiana* INOUE 1982, ♂, labeled, “新川 (アラカワ) [Arakawa], Ishigaki Is., Ryukyu, 13. VI. 1962, R. Kanô / HOLOTYPE, *Eterusia aedea ishigakiana* INOUE (1980 [sic]) [in hand writing on red label].” Paratypes of *ishigakiana*:—Ishigaki Is., Omoto, 1 ♂ 1 ♀, 24. VII. 1967, H. FUJITA leg., Omoto-dake, 1 ♂, 30. XI. 1981, K. DEGUCHI leg., Kainan, 1 ♀, 16. VI. 1962, R. KANÔ leg., Bannadake, 1 ♀, 30. VIII. 1978, Y. MATSUURA leg., Tôro-gawa, 2 ♂, 17. III. 1964, T. SHIRÔZU leg., 1 ♂, VI. 1934; Iriomote Is., Shirahama, 14. XI. 1963, H. INOUE leg.

Okinawa Is.:—Naha, 1 ♂, 28. VII. 1916. Ishigaki Is.:—Omoto, 1 ♀, 28. III. 1987, S. ITO leg., 2 ♂ 3 ♀, ex ova laid on 28. III. 1987, emerged on VII. 1987, S. ITO leg. Iriomote Is.:—Shirahama, 2 ♂, 11. XI. 1977, S. AZUMA leg. Yonaguni Is.:—Nr Mt. Urabu-dake, 1 ♂, 17. III. 1987, M. MINAMI leg.

Distribution. Southern Okinawa Island? and the Yaeyama Islands.

Diagnosis. Large moth. Forewing narrow, anal angle not so prominent; ground colour bright green, tinged with gold in some specimens; transverse bands broad in male, not so broadened as in *sakaguchii*; median band edged with blue black shade which is weaker than that in *sakaguchii* in male; discocellular mark very large, rounded; termen clearly edged with blue black. Inner black band of hindwing very narrow; terminal band broad, luminous in turquoise blue. In male genitalia (Figs. 27–28), process of 8th sternite with a minute projection which is absent in the other Japanese subspecies and the holotype of *okinawana*, uncus rectangular instead of trapezoidal one in the other Japanese forms, membraneous portion wider than in *sakaguchii*, apical margin slightly arcuate. In female genitalia (Fig. 39), 7th

sternite long triangular.

Notes. Although the holotype of *okinawana* has different male 8th sternite, without an additional minute projection on lateral process, another specimen from southern Okinawa has similar genitalia to those in Ishigaki and Iriomote ones. I found the same variety in a Taiwanese specimen.

NAGAYOSHI (1967) noted that MATSUMURA separated two subspecies, *okinawana* from the Yaeyama Group and *sakaguchii* from Okinawa Island. However, such a treatment was not made by MATSUMURA in his two papers in 1927 and 1931. INOUE (1982) considered that "*okinawana*" and "*sakaguchii*" belonged to the same subspecies and described a new subspecies from the Yaeyama Group in comparison with his Okinawa specimens, all of which were *sakaguchii*.

Subspecies *okinawana* is clearly distinguished from *sakaguchii* by the size, maculation, and genitalia of both the sexes. No intermediate specimen has hitherto been collected. However, their distributional ranges are not clearly separated; NAGAYOSHI (1967) figured a female specimen of *okinawana*, collected at Izumi, the Motobu Peninsula, and a female of *sakaguchii* was also collected at Nago, lying at the base of the same peninsula. It is conceivably possible that some moths had migrated to Okinawa from the Yaeyamas.

Judging from genitalic characters, this subspecies is much more closely related to the Taiwanese population, and the wing maculation of the latter is also very similar.

Larvae hatched within a week from ova laid by a female collected on Ishigaki Is. on 28th March, and preferred to eat *Camellia japonica*, *C. Sasanqua* and *Thea sinensis*. Although the observation was made in a room, male and female moths were actively flying under the condition beyond 15°C at day time, and they fed on sugared water and survived more than one month (NISHIHARA, personal communication).

Eterusia aedeia formosana JORDAN

(Fig. 15–16)

Eterusia aedeia formosana JORDAN, 1908, in SEITZ (ed.), Gross-Schmett. Erde, 10: 34; STRAND, 1917, Arch. Naturg., 82A(3): 143; HERING, 1922, Arch. Naturg., 88A(11): 64; BRYK, 1936, in STRAND (ed.), Lepid. Cat., 71: 208; NAGAYOSHI, 1967, Tyô to Ga, 18: 36, fig. 8.

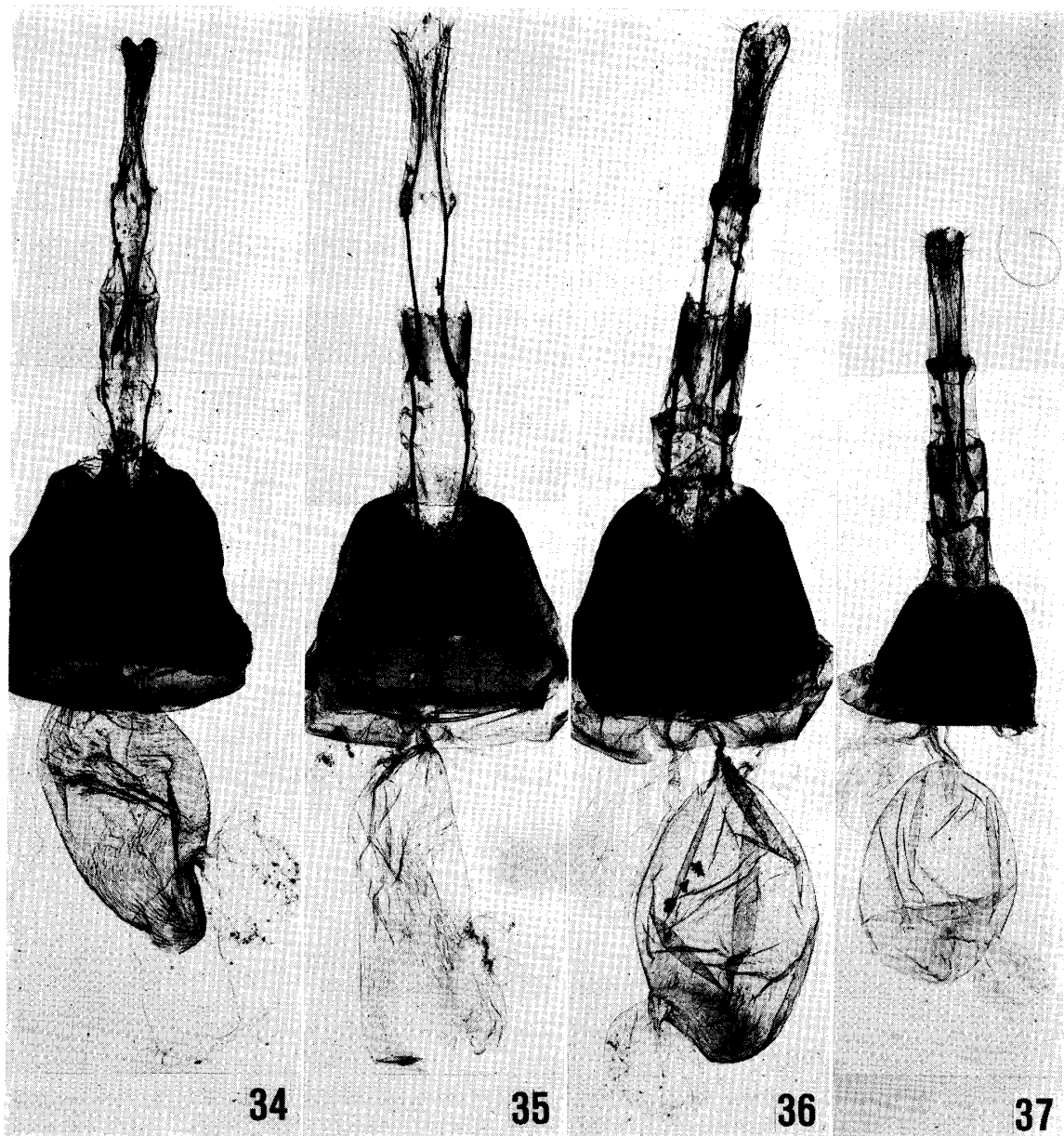
‡*Eterusia aedeia* ab. *postlutea* STRAND, 1917, Arch. Naturg., 82A(3): 142, named as abnormal form, unavailable.

‡*Eterusia aedeia formosana* f. *postlutea*: HERING, 1922, Arch. Naturg., 88A(11): 64; BRYK, 1936, in STRAND (ed.), Lepid. Cat., 71: 208, infrasubspecific.

Eterusia aedeia: MATSUMURA, 1931, 6000 illust. Ins. Japan-Empire, 987, part, pl. 7, fig. 5.

Length of forewing. ♂, 31–35 mm; ♀, 34–36 mm.

Material examined. Taiwan:—Taipei Pref., Yangminshan, 1 ♀, 5. VII. 1964, H. INOUE leg., Wulai (400 m), 14. VIII. 1985, S. SUGI leg.; Taoyuan Pref., Palin (1,000 m), 1 ♀, 1. V. 1985, K. SAKAI leg., 2 ♂, 31. VII–2. VIII. 1985, S. SUGI & A. KAWABE leg.; Hualien Pref., Wenshan Spa (580 m), 3 ♂, 4–5. VIII. 1983, S. SUGI leg., Hungyeh Spa (200 m), 1 ♂, 29–30. III. 1984, S. SUGI leg.; Nantou Pref., Nanshanchi, 1 ♂, 3. IV. 1987, C. C. Lo leg., Shihtyutou, 3 ♂, XII. 1983, C. C. Lo leg., Wushe, 3 ♂, 1966, Kuantauchi, 1 ♂, 8. VIII. 1972,

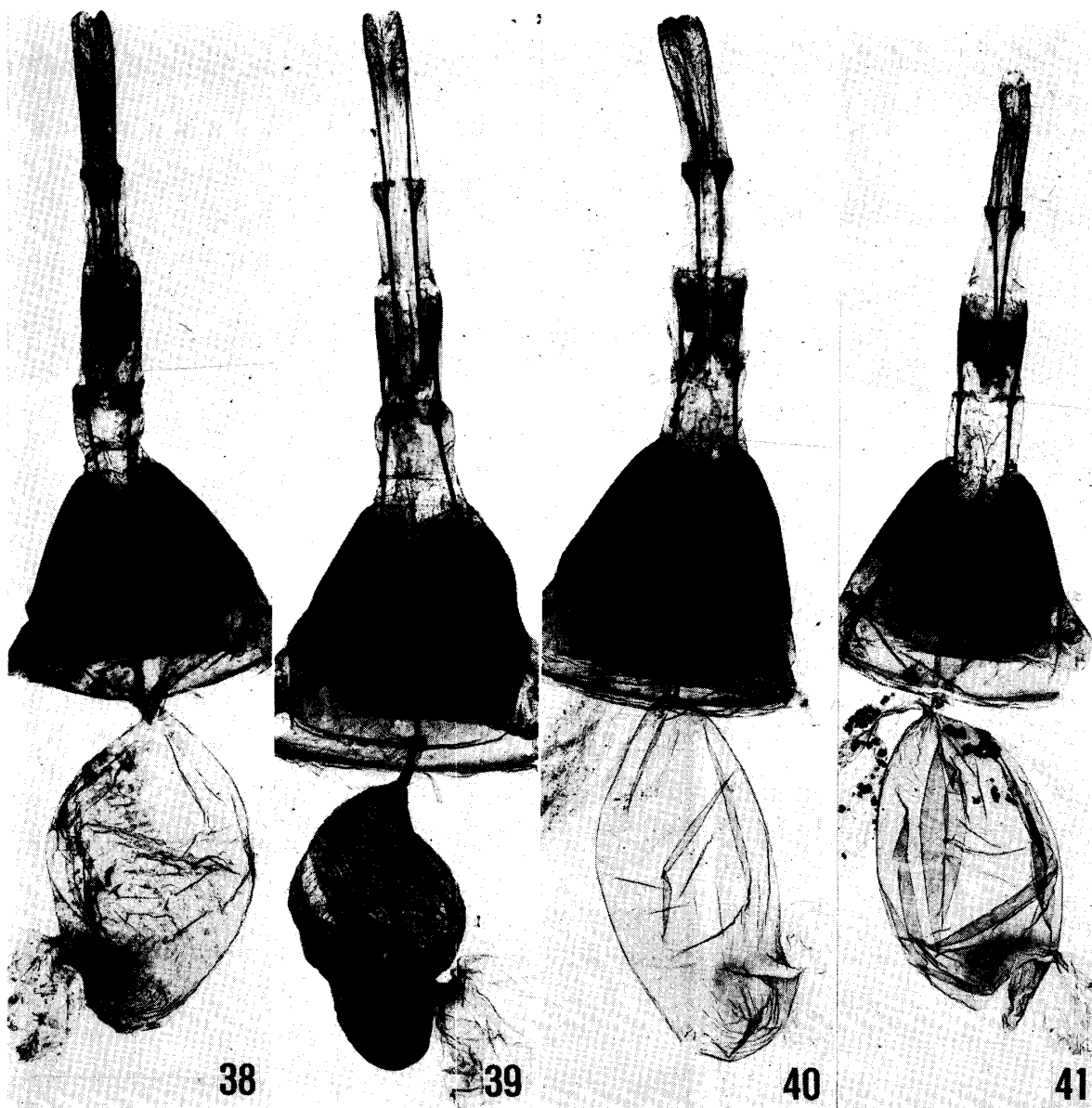


Figs. 34–37. Female genitalia of *Eterusia aedea* subspecies. — 34. Subsp. *sugitanii*, Oki. — 35. Subsp. *sugitanii*, Kagoshima. — 36. Subsp. *micromaculata*, paratype, Yakushima. — 37. Subsp. *tomokunii* nov., paratype, Amami-ôshima.

2 ♂, 31. X. 1972, S. YAMANE leg., Meifeng, 1 ♀, 26. X. 1972, S. YAMANE leg.; Chiayi Pref., Chiuchi, 1 ♂, 14. IV. 1983, Y. YANO leg.; 'Central Taiwan', 1 ♀, 1960; 'Taiwan', 2 ♀, without other data.

Distribution. Taiwan.

Diagnosis. Very similar to *okinawana*. Ground colour of forewing much darker, median transverse line not edged with blue black, terminal margin not so prominent as in *okinawana*; inner black band of hindwing much broader, bluish luminescens of terminal band weaker. Male genitalia (Fig. 29) almost identical with those of *okinawana*, apical margin of uncus slightly produced at middle. Female genitalia (Fig. 40) as in *okinawana*.



Figs. 38-41. Female genitalia of *Eterusia aedeia* subspecies. — 38. Subsp. *sakaguchii*, Okinawa. — 39. Subsp. *okinawana*, Ishigakijima. — 40. Subsp. *formosana*, Taiwan. — 41. Subsp. *edocla*, Nepal.

Notes. There are several generations a year; moths fly and mate in day time, and larvae are one of the pests of tea-plantations, though their damage is not serious (SONAN, 1937).

***Eterusia aedeia aedeia* (CLERCK)**

(Fig. 17)

Papilio aedeia CLERCK, 1759, Icones, pl. 4, fig. 2.

Eterusia aedeia aedeia: JORDAN, 1908, in SEITZ (ed.), Gross-Schmett. Erde, 10: 34.

Eterusia tricolor: WANG, 1981, in WANG *et al.* (eds.), Icon. Heteroc. Sinic., 1: 94, pl. 22, fig. 598, nec HOPE, 1840.

Length of forewing. ♂, 27–34 mm.

Material examined. Chekiang Prov., 1 ♂, without other data; Szechwan Prov., China, 2 ♂, 20. X., 10. XI. 1988.

Distribution. China.

Diagnosis. Very similar to *formosana*. Transverse bands of forewing markedly broad, especially in male; inner band of hindwing broader than that of *formosana*, terminal band broad, bluish luminescens less developed. In male genitalia (Fig. 30), uncus rectangular, membranous in basal and middle portion.

Notes. Larva was described and figured by ZHU *et al.* (1979, pp. 17–18, pl. 4, fig. 15), damaging plantations of tea and *Camellia oleifera*. The male specimen (Fig. 17) may be an exceptionally small moth in the nominotypical race.

Eterusia aedea edocla DOUBLEDAY

(Figs. 19–20)

Heterusia edocla DOUBLEDAY, 1847, Zoologist, 2: 469.

Heterusia signata MÖSCHER, 1872, Stett. ent. Ztg., 33: 341.

Eterusia magnifica BUTLER, 1879, Trans. ent. Soc. Lond., 1879: 5.

Eterusia aedea edocla: JORDAN, 1908, in SEITZ, (ed.), Gross-Schmett. Erde, 10: 34, pl. 6, line e.

‡*Eterusia aedea adocla* [sic] ab. *lepcha* JORDAN, 1908, in SEITZ (ed.), Gross-Schmett. Erde, 10: 34, infrasubspecific, unavailable.

Eterusia aedea: WANG, 1981, in WANG *et al.* (eds.), Icon. Heteroc. Sinic., 1: 93, pl. 22, fig. 595.

Eterusia aedea magnifica: WANG, 1981, in WANG *et al.* (eds.), Icon. Heteroc. Sinic., 1: 93–94, pl. 22, fig. 596.

Length of forewing. ♂, 30–37 mm; ♀, 30–37 mm.

Material examined. Nepal;—Gandaki Zone, Parbat Dist., Ulleri (2,070 m), 1 ♂ 1 ♀, 14. X. 1981, M. OWADA leg.; E. Nepal, Bodha Vill., 1 ♀, 20. VI. 1975; Kathmandu (1,300 m), 1 ♂, 16. IX. 1981, M. OWADA leg., 1 ♀, 5. X. 1981, S. AE leg.; Kathmandu, Sarjebinayak (1,400 m), 1 ♂, 10. IX. 1981, S. AE leg., Suwayanbonath, 1 ♂, 24. IX. 1987, T. HARUTA leg., Sundarijal (1,600 m), 8. X. 1981, M. OWADA leg., Gokarna Ban (1,370 m), 1 ♂, 17. X. 1979, M. SATÔ leg., Godawari, 1 ♂, 3. VI. 1979, 2 ♂, 11. VI. 1987; E. Nepal, Dhoban, 4 ♂, 28. VII. 1974, S. YAMAGUCHI & T. AOKI leg. India:—1 ♀, nr. Darjeeling, Lopchu (1,600 m), 5. V. 1984, K. NOGAMI; Assam, 8 ♂ 5 ♀, without other data. Burma:—Maymyo, 1 ♂, 5. V. 1983, A. SETO leg. Thailand:—Chiangmai, Doi Pui, 1 ♂, 16. V. 1985, 1 ♂, 30. VII. 1984; Loei Prov., Phu Rua National Park (1,200 m), 1 ♂, 21. VIII. 1987, M. OWADA leg.; Khao Yai, 1 ♂, 19–20. VII. 1966, H. INOUE & OKAGAWA leg.

Distribution. China (Yun-nan?), Nepal, northern India, Burma, Thailand.

Diagnosis. Forewing dark to blackish green, tinged with reddish brown in some specimens; transverse bands narrower than those of nominotypical subspecies. Markedly variable in hindwing, which is either similar in pattern to the other races (Fig. 20) or completely blue black (Fig. 19), and various intermediate patterns occur between them. Male genitalia (Fig. 31) similar to those of subsp. *aedea*, process of 8th sternite with a minute projection; uncus rectangular, valva rather short. Female genitalia (Fig. 41) similar to those of *formosana*,

7th sternite rather short.

Notes. This subspecies is well known as a notorious pest of tea-plantations in India. Males were flying in daytime, not attracted to a light trap in my Himalayan collecting trips. According to Mr. K. HORIE (oral communication), he captured several males in the evening at Pokhala, C. Nepal, where moths seemed to outbreak.

The male genitalia of Thai specimen (Fig. 36) are somewhat different from those of other countries, i.e., the uncus is very short and widely membranous in middle portion, and valva is slender. All the specimens in my hands have blue black hindwings in which the median yellowish mark is very small and not developed into a wide band.

Eterusia aedea virescens BUTLER

(Fig. 18)

Heterusia virescens BUTLER, 1881, Illust. typical Specimens Lepid. Heteroc. Coll. Br. Mus., 5: 21, pl. 83, fig. 3.

Eterusia aedea virescens: JORDAN, 1908, in SEITZ (ed.), Gross-Schmett. Erde, 10: 34.

Length of forewing. ♂, 28–31 mm.

Material examined. S. India:—Nilgiri Hills, Gudalur (1,200 m), 3 ♂, 10. X.–3. XI. 1977, T. HASEGAWA leg.

Distribution. Southern India.

Diagnosis. Small moth. Forewing rather slender, median band well developed, discocellular mark minute or vestigial, outer band vestigial. Basal black band well developed, median band whitish, not tinged with yellow. In male genitalia (Fig. 33), process of 8th sternite with a minute projection; uncus rather short, apical margin slightly produced at middle, medial membranous area well developed.

Notes. It is worth noting that this form is similar to the smallest form of the subspecies *sugitanii* from Nara and Wakayama, Japan, but the median white band of hindwing in *virescens* is clearly narrower.

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要 約

オキナワリチラシは、スリランカ、インド、ネパール、ビルマ、タイ、中国、台湾をへて琉球列島から本州中部まで広く分布する種で、多くの亜種に分けられている。井上 (1982) は、日本の亜種を、それまでの知見と多くの標本をもとに、本州、四国、九州、沖ノ島、隠岐、対馬のものを亜種 *sugitanii* MATSUMURA, 1927, 屋久島のものを亜種 *micromaculata* INOUE, 1982, トカラ列島から奄美大島と沖縄のものを亜種 *okinawana* MATSUMURA, 1931, 八重山諸島のものを亜種 *ishigakiana* INOUE, 1982 とした。

最近、当館の友国雅章氏が奄美大島で採集した多数の標本が、屋久島や沖縄のものと違うことに気づき、もう一度琉球列島を中心に本種の亜種を再検討し、以下のような結論に達した。

Eterusia aedeia sugitanii MATSUMURA, 1927

分布：本州、四国、九州、沖ノ島、隠岐、対馬。

本亜種は常緑広葉樹林内に生息し、茶の害虫とはならないようで、年1化を基本的な生活環としている。成虫は8～9月に出現するが、九州南部では6月に1♂が採集されているので、2化することもあるようである。雄はよく灯火に飛来するが、雌ではそういうことはない。伊豆の湯ヶ島では多数の雄が採集されているが、そのほとんどが灯火に来たもので、昼はあまり活動していないようである。また、この地では、幼虫が野外でヒサカキから採集されている。一方、隠岐で採集された雌から採卵されたものはヤブツバキを好み、ヒサカキはあまり食べなかったという。たいへん局地的な発生をし、分散力もあまりないようで、地域による変異が認められる。伊豆湯ヶ島のものがもっとも大きく、奈良と和歌山のものが最小、四国や九州のものはその中間くらいで、隠岐や対馬の雄の前翅の白帯は幅広く、中国大陆のものにすこし似てくる。これらの関係はもうすこし標本を集めてから論じたい。

Eterusia aedeia micromaculata INOUE, 1982

分布：屋久島、中ノ島（トカラ列島）。

斑紋や大きさは奈良・和歌山のものに似ているが、雄交尾器はむしろ隠岐のものに似る。年2化すると考えられる。トカラ列島のものは斑紋がやや異なるが、この亜種のものとして扱っておく。

Eterusia aedeia tomokunii OWADA, 1989

分布：奄美大島。

屋久島亜種に似るがより小型で、前翅は赤褐色のことが多く、中央の白帯は中室の下で外方へずれ、内縁が直角をなす。雄交尾器の差は大きい。友国氏によると、湯湾岳の発達した暖温帯林を通る林道で、曇天の午後、高さ3～4mの梢をゆっくりと飛翔していたという。雄の方が活発で、雌のほとんどは葉上に止まっていたらしい。少なくとも年2化はしている。

Eterusia aedeia sakaguchii MATSUMURA, 1931

分布：沖縄北部、渡嘉敷島。

小型で奄美大島のものに似るが、前翅が幅広く、斑紋も顕著。沖縄北部の山原地方の暖温帯林に生息する。井上 (1982) が亜種 *okinawana* として図示したものは本亜種である。学名の適用については次亜種の項で述べる。渡嘉敷島の雄の斑紋は *sakaguchii* とほとんど変わらないが、交尾器はかなり違う。

Eterusia aedeia okinawana MATSUMURA, 1931

分布：沖縄南部？，八重山諸島。

大型で、前翅はあざやかな緑色、赤みを帯びる変異があるのはほかの亜種と変わらないが、黄金色を帯びるものもいる。後翅外縁の黒帯内の青の輝きも、もっともあざやか。井上(1982)は沖縄で採集されるものすべてを同一の亜種と考え、八重山諸島産のものだけを別亜種 *ishigakiana* INOUE, 1982 としたが、八重山諸島タイプのもは沖縄南部でも採集され、*okinawana* のホロタイプは明らかにこちらに属している。亜種 *sakaguchii* との分布の境界は今のところはっきりしていないが、本部半島の名護で *sakaguchii* の雌が採集されている一方で、伊豆味では *okinawana* の雌が採れている。沖縄で採集された *okinawana* は、八重山諸島から侵入したものかもしれない。雄の第8腹板後側にある1対の角状の突起には、微小ではあるが明瞭な副突起が認められる。この微小突起は *sakaguchii* までの日本の亜種にはなく、台湾とアジア大陸のものにはある。ただし、*okinawana* のホロタイプはこれを欠く。このような変異は、ほかには台湾のものから1個体見いだしているにすぎない。年に数世代の発生があると考えられる。幼虫は、飼育下ではツバキ、サザンカ、チャをよく摂食した。成虫は、これも飼育下ではあるが、室温15度以上で雌雄とも活発に飛翔し、砂糖水を与えれば1カ月は生きるとのことである。

Eterusia aedeia formosana JORDAN, 1908

分布：台湾。

前亜種にたいへんよく似ているが、前翅の地色ははるかに暗く、後翅外縁の輝きも少ない。雄交尾器の形態にもわずかであるが差が認められる。成虫は昼飛性で、年に数世代をくりかえす。幼虫は茶の害虫として記録されているが、その被害は軽微であるという。

Eterusia aedeia aedeia (CLERCK, 1759)

分布：中国。

台湾亜種に似ているが、前翅の横線は幅が広い。図示した個体は浙江省のものであるが、例外的な小型個体の可能性が高い。幼虫は朱ほか(1979)によって図示され、茶や油茶 (*Camellia oleifera*) の害虫で、年2～3世代をくりかえす。

Eterusia aedeia edocla DOUBLEDAY, 1847

分布：中国(南西部)、ネパール、インド北部、ビルマ、タイ。

雌雄とも後翅が多型的で、完全に黒いものから、中央に白帯のでもものまで、漸進的に変化する。インドでは茶の大害虫として恐れられている。成虫は昼飛性で、私の4回におよぶヒマラヤとタイの調査では、夜間採集で採集したことがない。

タイの雄交尾器はネパールのもものと少し違うし、後翅はすべて黒色型であった。

Eterusia aedeia virescens BUTLER, 1881

分布：インド(南部)。

小型で、奈良・和歌山のものにやや似るが、後翅の中央白帯ははるかにせまい。

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